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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/853,217	05/11/2001	Douglas E. Weiss	55944USA9A.002	6357

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EXAMINER	
TSOY, ELENA	

ART UNIT	PAPER NUMBER
1762	

DATE MAILED: 10/20/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/853,217	WEISS ET AL.	
	Examiner	Art Unit	
	Elena Tsoy	1762	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06 January 2006* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-15 and 18-22* is/are pending in the application.

4a) Of the above claim(s) *18-22* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-15* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *6/14/200* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on October 13, 2006 has been entered.

Response to Amendment

Amendment filed on October 13, 2006 has been entered. Claims 1-15, and 18-22 are pending in the application. Claims 18-22 are withdrawn from consideration as directed to a non-elected invention.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-15 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Weiss et al (WO 00/04055) in view of Loda (US 4,163,172), Mukohyama et al (US 4,886,840) and Botman et al (Nuclear Instruments and Methods in Physics Research B 139) for the reasons of record set forth in paragraph 2 of the Office Action mailed on 10/03/2005 because Weiss et al teach that the method produces a *pressure-sensitive adhesive* (See Abstract), as required by Amendment.

Response to Arguments

3. Applicants' arguments filed October 13, 2006 have been fully considered but they are not persuasive.

(A) Applicants argue that none of the references cited by the Examiner describe providing a pulse rate greater than or equal to about 500 pulses per second. The Examiner has asserted that since total dose is a function of pulse frequency, dose per pulse and residence time it is not inventive to discover the optimum or workable ranges of result-effective variables by routine experimentation. However, there is nothing in the cited references that would indicate that the devices for generating e-beams described therein would even have been capable of providing pulse frequencies greater than or equal to 500 Hz. For example, the upper range described by Botman is 50 Hz, which is far below the 500 Hz recited in the present claims.

The Examiner respectfully disagrees with this argument. The cited references show that the total dose is critical to achieve polymerization. Loda, Botman and Mukohyama et al teach that the total dose can be achieved using varying dose rate, e.g., 0.92 Gy to 75 Gy, residence time, and frequency. For example, Weiss et al teach that for some applications, the total dose of 100 kGy over residence time of greater than 1 second is required. As shown by Botman et al, for free radical polymerization of an acrylic monomer on seed latex, the total dose of 1700 Gy is required which can be achieved using pulses at dose per pulse of 0.92 Gy at pulse rate of 25 Hz (pulse per sec) (See page 493, paragraph 4.2, column 2) or pulses of 50 Hz and 3 Gy per pulse (See Abstract). Thus, the upper range of 50 Hz, described by Botman, is required to achieve the total dose of only 1700 Gy. Clearly, one of ordinary skill in the art at would easily recognize that to achieve the total dose of 100,000 Gy (100 kGy) for approximately the same residence time, much higher frequency, including over 500 Hz, should be used.

(B) Applicants assert that they have discovered that the manner in which the dose is delivered can have dramatic effect on the polymerization process itself: when the doge per pulse is relatively low (e.g.. about l 0 to about 90 Gy) and the pulse rate is below about 500 Hz, the reaction takes place predominantly in the homogeneous mode because of the longer time, and the frequency of above 500 Hz, the heterogeneous mode of polymerization becomes more dominant. This surprising and unexpected discovery is not appreciated or otherwise disclosed anywhere in the art of record. It is a totally new, highly efficient and unexpected way to achieve, for example, the advantage of heterogeneous mode of polymerization in a single-phase system.

The Examiner respectfully disagrees with this argument. First of all, Loda teaches that polymerization is affected not only by the total dose of radiation, but also by the rate at which the dose is delivered: the high dose rate of very short electron beam pulses, of the order of microseconds (high frequency of more than 500), elicits chemical reactions, which may be different from those produced by the impact of *long pulses* or continuous radiation (See column 1, lines 53-60). Therefore, the fact that the manner in which the dose is delivered can have dramatic effect on the polymerization process itself was well known in the art.

(C) Also, Applicants assert that the prior art references utterly fail to teach or suggest the benefit of a relatively low dose per pulse and a high pulse rate. For example, Loda fails to teach, appreciate, or make obvious the benefits of using low dosage and high frequency to irradiate a polymerizable composition. Indeed, Loda remarks that short length pulses are not desirable when it states that "pulses obtainable from a cold cathode electron gun are thus of very short length and of limited usefulness for certain purposes". Column 1, lines 50 to 52 (emphasis added). Loda subsequently speculates that changing of pulse frequency and total duration may elicit different chemical reactions, but utterly fails to teach whether high or low pulse frequencies

are desirable. Thus, nothing in Loda teaches whether a high pulse frequency is desirable or whether a low pulse frequency is desirable. Loda merely contains a brief speculative statement that changing the pulse frequency may impact the polymerization process. Indeed, it would be more credible to assert that, based upon Loda, pulse frequency should be kept low rather than high, because of the statement in Loda that high frequency pulses are of limited usefulness.

The Examiner respectfully disagrees with this argument. As Applicants correctly noticed, Loda states that "pulses obtainable from a cold cathode electron gun are thus of very short length and of *limited* usefulness for certain purposes". Column 1, lines 50 to 52. In other words, according to Loda, pulses obtainable from a cold cathode electron gun of a very short length **do** have **usefulness** (though *limited*) for certain purposes. Therefore, in contrast to Applicants argument, Loda does teach that a high pulse frequency is *desirable* for certain purposes.

(D) Applicants assert that the Examiner refers to Applicants' disclosure at page 2, lines 3-7 for the proposition that heterogeneous e-beam polymerization produces highly gelled polymers of adequate chain lengths between crosslinks. However, the Examiner overlooks the further assertion at page 2, lines 7-10 that three known methods of achieving heterogeneous polymerization include emulsion, solid phase catalysis, and precipitating conditions, and that all three of these methods involve phase separation to maintain the heterogeneous conditions. This is a totally new, highly efficient and unexpected way to achieve the advantage of heterogeneous polymerization in a single phase system. There is no precedence for this in the prior art, and therefore, the claimed invention is patentable over the cited references.

The Examiner respectfully disagrees with this argument for the following reasons:

(i) Weiss et al **expressly** teach that it is believed that, in contrast to *prior art e-beam polymerization* producing short-chain, branched, highly crosslinked polymeric structures (See

page 3, lines 8-12), by conducting e-beam polymerization at **temperatures below 20^0C**, the rate of polymer chain propagation is *increasingly* favored over the rate of termination, with the effect of producing polymers with a higher gel content and higher conversion (See page 11, lines 9-13) to provide the necessary balancing of viscous and elastic properties required for a pressure-sensitive adhesive (See page 2, lines 3-10) by producing **long-chain** polymers with ***limited*** crosslinking over a broad range of coated thicknesses and with high conversion (See page 3, lines 21-25). As described in the Applicants' disclosure on page 2, lines 3-7, and page 6, lines 20-21), e-beam polymerization produces highly gelled polymers of adequate chain lengths between crosslinks over a broad range of coated thicknesses only when it is carried out *heterogeneously in a single phase* in contrast to homogeneous e-beam polymerization which produces short-chain, branched, highly crosslinked polymeric structures (See specification, page 4, lines 8-32). Therefore, it appears that e-beam polymerization of Weiss et al at **temperatures below 20^0C** occurs heterogeneously in a single phase ***inherently***.

(ii) As was discussed in the Office Action mailed on 2/14/2005, it would have been obvious to one of ordinary skill in the art to have determined the optimum values of the relevant dose per pulse parameters within a range of 0.92 Gy per pulse of Botman et al to 75 Gy per pulse of Mukohyama et al, pulses per second parameters including those within claimed range of 500-3,000 when used electron beams of 0.92 Gy per pulse of Botman et al to 75 Gy per pulse of Mukohyama et al and the optimum values of the relevant residence time parameters (including those of claimed invention) in Weiss et al through routine experimentation to *provide the necessary balancing of viscous and elastic properties required for a pressure-sensitive adhesive* by producing polymers having high molecular weight lengths between crosslinks. Since Weiss et al had chosen conditions of carrying out e-polymerization (e.g. temperatures below 20^0C) to

produce **long-chain** polymers with ***limited*** crosslinking over a broad range of coated thicknesses and with high conversion and Loda teaches that e-polymerization is affected not only by the total dose of radiation, but also by the rate at which the dose is delivered: the high dose rate of very short electron beam pulses, of the order of microseconds (high frequency of more than 500), elicits chemical reactions, which may be different from those produced by the impact of long pulses or continuous radiation (See column 1, lines 53-60), the optimum values of the relevant dose/pulse and pulse rate Weiss et al in view of Loda, Botman et al and Mukohyama et al determined by routine experimentation would be within claimed ranges of low dose/pulse and high pulse rate in order to produce long-chain polymers with limited crosslinking.

(iii) According to Weiss et al, conducting e-beam polymerization at **temperatures below 20^0C** and a predetermined total dose with any mode of applying e-beam, achieves long chain polymers and provides the necessary balancing of viscous and elastic properties required for a pressure-sensitive adhesive. Therefore, one of ordinary skill in the art would have reasonable expectation of success of achieving at least the same results in Weiss et al in view of Loda, Botman et al and Mukohyama et al with ***optimum*** dose/pulse and pulse rate parameters.

Conclusion

4. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period

will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Elena Tsoy whose telephone number is 571-272-1429. The examiner can normally be reached on Monday-Thursday, 9:00AM - 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on 571-272-142323. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

ELENA TSOY
PRIMARY EXAMINER

Elena Tsoy
Primary Examiner
Art Unit 1762

October 16, 2006